# ASSIGNMENT 1(AUCTION)

## CODE:

S1\_vm = {"S1":7,"S2":6,"S3":5,"S4":9}  
S1\_bid = {"S1":20,"S2":23,"S3":19,"S4":30}  
U1\_vm={"B1":4 ,"B2":3,"B3":2,"B4":5 }  
U1\_bid={"B1":25 ,"B2":22,"B3":17,"B4":21 }  
  
sorted\_s1 = dict(sorted(S1\_bid.items(), key=lambda kv: kv[1]))  
sorted\_u1 = dict(sorted(U1\_bid.items(), key=lambda kv: kv[1], reverse=True))  
print(sorted\_s1)  
print(sorted\_u1)  
dict1={}  
for i in sorted\_u1.keys():  
 for j in sorted\_s1.keys():  
 if S1\_vm[j]>=U1\_vm[i]:  
 dict1[i]=j  
 S1\_vm[j]=S1\_vm[j]-U1\_vm[i]  
 #del U1\_vm[i]  
 break  
print("Allocation: ",dict1)  
lst\_seller=[]  
lst\_user=[]  
for i,j in dict1.items():  
 lst\_seller.append(S1\_bid[j])  
 lst\_user.append(U1\_bid[i])  
print("Price to be paid by each buyer will be: ",max(lst\_seller))  
print("Payment received to all sellers will be: ",min(lst\_user))  
a1={}  
a2={}  
for i,j in dict1.items():  
 p=max(lst\_seller)-S1\_bid[j]  
 q=U1\_bid[i]-min(lst\_user)  
 a1[j]=p  
 # print(a1)  
 a2[i]=q  
 # print(a2)  
print("profit of each seller is ",a1)  
print("profit of each user is ",a2)  
  
sum1=0  
for i, j in a1.items():  
 for k, m in dict1.items():  
 if (i==m):  
 sum1=sum1+(j\*U1\_vm[k])  
print(sum1)  
print("the average of seller after selling the machines: ",sum1/len(a1))  
  
sum2=0  
for i,j in a2.items():  
 for k,m in U1\_vm.items():  
 if(i==k):  
 sum2=sum2 + (j\*m)  
print(sum2)  
print("the average profit of seller after selling the machines: ",sum2/len(a2))  
  
b1=len(a1)  
b2=len(a2)  
print("the average profit of buyer per machine is ",(sum(a1.values())/b1))  
print("the average profit of user per machine is ",(sum(a2.values())/b2))  
  
  
# lst\_seller={}  
# lst\_user={}  
# print(lst\_seller)  
#print(lst\_user)

|  |  |  |
| --- | --- | --- |
| SELLERS | AVAILABLE VMs | COST OF EACH VM |
| S1 | 7 | 20 |
| S2 | 6 | 23 |
| S3 | 5 | 19 |
| S4 | 9 | 30 |

SELLER INFORMATION

BUYER/USER INFORMATION:

|  |  |  |
| --- | --- | --- |
| BUYERS/USERS | REQUIRED VMs | VALUATION/Bid |
| U1 | 4 | 25 |
| U2 | 3 | 22 |
| U3 | 2 | 17 |
| U4 | 5 | 21 |

EXPLANATION:

STEP1:

S1\_vm = {"S1":7,"S2":6,"S3":5,"S4":9}  
S1\_bid = {"S1":20,"S2":23,"S3":19,"S4":30}  
U1\_vm={"B1":4 ,"B2":3,"B3":2,"B4":5 }  
U1\_bid={"B1":25 ,"B2":22,"B3":17,"B4":21 }

~ S1\_vm is the dictionary for available VMs, S1\_bid is the dictionary for cost of each VM.

~ U1\_vm is the dictionary for required VMs of buyer, U1\_bid is the dictionary for bid of each VM.

~ We have 4 sellers(CSP=CLOUD SERVICE PROVIDER) and 4 buyers/users here.

~ We are taking availability of virtual machines(VMs) with each seller and the cost per VM.

~ Similarly we are taking requirement of each buyer of VM and the bid that they are keeping.

STEP2:

sorted\_s1 = dict(sorted(S1\_bid.items(), key=lambda kv: kv[1]))  
sorted\_u1 = dict(sorted(U1\_bid.items(), key=lambda kv: kv[1], reverse=True))  
print(sorted\_s1)  
print(sorted\_u1)

~ Now we are sorting the number of sellers in ascending order of their bid

~ Also we are sorting the number of buyers in descending order of their bid.

STEP3:

dict1={}  
for i in sorted\_u1.keys():  
 for j in sorted\_s1.keys():  
 if S1\_vm[j]>=U1\_vm[i]:  
 dict1[i]=j  
 S1\_vm[j]=S1\_vm[j]-U1\_vm[i]  
 #del U1\_vm[i]  
 break  
print("Allocation: ",dict1)

~ In next step, we are allocating the buyer to the seller if seller has sufficient resources then allocated.

~ We have stored the allocation in an empty dictionary named dict1.

STEP4:

lst\_seller=[]  
lst\_user=[]  
for i,j in dict1.items():  
 lst\_seller.append(S1\_bid[j])  
 lst\_user.append(U1\_bid[i])  
print("Price to be paid by each buyer will be: ",max(lst\_seller))  
print("Payment received to all sellers will be: ",min(lst\_user))

~ In this step, we are creating two empty list to store maximum bid of seller and minimum bid of buyer/user respectively.

STEP5:

a1={}  
a2={}  
for i,j in dict1.items():  
 p=max(lst\_seller)-S1\_bid[j]  
 q=U1\_bid[i]-min(lst\_user)  
 a1[j]=p  
 # print(a1)  
 a2[i]=q  
 # print(a2)  
print("profit of each seller is ",a1)  
print("profit of each user is ",a2)

~ In this step, we are creating another two empty lists to store profit of each seller and each buyer in those empty l respectively.

~ For calculating profit of each seller, we are considering maximum value of cost and subtracting remaining values from that maximum value. Here in my code, it is max(lst\_seller)-S1\_bid[j]

~ Similarly, for calculating profit of each buyer/user, we are considering minimum value of bid and subtracting remaining values to that minimum value. Here in my code, it is U1\_bid[i]-min(lst\_user)

STEP6:

b1=len(a1)  
b2=len(a2)  
print("the average profit of seller is ",(sum(a1)/b1))  
print("the average profit of user is ",(sum(a2)/b2))

~ In this step, we are calculating the average of profit of seller and buyer/user.

~ So, here sum(a1) is addition of profits stored in a1 and sum(a2) is addition of profits stored in a2.